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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/604,275	07/08/2003	Dirk Sonksen	21295-56	1274

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EXAMINER	
YAM, STEPHEN K	

ART UNIT	PAPER NUMBER
2878	

DATE MAILED: 02/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/604,275	SONKSEN ET AL.	
	Examiner	Art Unit	
	Stephen Yam	2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 December 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 December 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This action is in response to Amendments and remarks filed on December 21, 2005. Claims 1-21 are currently pending.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-6, 8, and 11-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamura et al. US Patent No. 5,780,866 in view of Katz et al. US Patent No. 6,172,349.

Regarding Claims 1 and 15, Yamamura et al. teach (see Fig. 1-5) a method and apparatus for scanning specimens (1) using an optical imaging system (6, 7, 8) and a scanning stage (2), comprising the steps of positioning the specimen on the scanning stage, calibrating the scanning stage (and displacing using a control unit (3) (see Fig. 1)) by obtaining and storing height values Z at different calibration positions X, Y of the scanning stage (see Col. 18, lines 26-35), and thereby generating a height profile of the scanning stage and storing it in a memory (see Col. 16, lines 44-48 and Col. 18, lines 28-45), scanning specimens (see Fig. 7 and 11), and thereby determining a reference height Z_{ref} (extreme-limit setting for Z-stage) of the specimen at the beginning of a specimen scan, traveling to specimen points X_p, Y_p using the scanning stage (see Fig. 7 and 11), setting/determining using a computation unit (9, 10) (see Fig. 1 and Col. 19, lines 8-22), while traveling to a respective specimen point X_p, Y_p, a specimen height position Z_p

pertinent to the respective specimen point X_p, Y_p, the specimen height position Z_p being determined from the reference height Z_{ref} and the height profile of the scanning stage (see Col. 18, lines 28-45), and acquiring an image and/or performing a measurement at specimen point X_p, Y_p (see Col. 2, lines 51-58, Col. 15, lines 31-40, and Col. 16, lines 1-13 and 43-50). Yamamura et al. do not teach the specimen as a wafer with a constant thickness and having three-dimensional features within a focusing depth of the imaging system. Katz et al. teach (see Fig. 1 and 5) a similar imaging system and method with a specimen (100) as a wafer (see Col. 1, lines 24-37, Col. 2, lines 42-44) with a constant thickness (see Fig. 1 and 5) on a scanning stage (101) and having three-dimensional features within a focusing depth (combined focusing depth of cameras 110 and 156- see Fig. 5) of the imaging system (see Col. 6, lines 9-28). It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the method and apparatus of Yamamura et al. towards a specimen as a wafer with a constant thickness and having three-dimensional features within a focusing depth of the imaging system, as taught by Katz et al., to enable high-resolution imaging for semiconductor components while providing optimal auto-focusing for a scanning process.

Regarding Claim 2, Yamamura et al. teach images of the specimen acquired by means of a camera, and/or measurements on the specimen being made by means of an optical measurement device, at specimen points X_p, Y_p (see Col. 15, lines 61-62 and Col. 16, lines 34-50).

Regarding Claims 3 and 18, Yamamura et al. in view of Katz et al. teach the method and apparatus in Claims 1 and 18, according to the appropriate paragraph above. Yamamura et al. do not teach the reference height Z_{ref} of the wafer identified at the beginning of the wafer scan by

focusing with a focusing system at a reference location X_{ref}, Y_{ref} of the wafer. It is well known in the art in a measurement system to calibrate the system prior to a measurement process according to a reference point or measurement, to ensure accurate/correct measurements. It would have been obvious to one of ordinary skill in the art at the time the invention was made to identify the reference height Z_{ref} at the beginning of the wafer scan by focusing with a focusing system at a reference location X_{ref}, Y_{ref} of the wafer, in the method and apparatus of Yamamura et al. in view of Katz et al., to provide accurate measurements to output correct focusing data for a clear image.

Regarding Claim 4, Yamamura et al. teach, upon calibration of the scanning stage, the height values Z are obtained by focusing with a focusing system (see Col. 18, lines 22-45).

Regarding Claim 5, Yamamura et al. teach, during the specimen scan, the image is acquired and/or the measurement is made without stopping the scanning stage at the specimen point X_p, Y_p (see Col. 2, lines 47-48 and Col. 22, lines 4-12).

Regarding Claim 6 (dependent from Claims 1, 2, 4, and 5), Yamamura et al. teach, with specimen points X_p, Y_p arranged line-by-line, the specimen points X_p, Y_p are scanned in meander fashion (see Fig. 7 and 11).

Regarding Claim 8, Yamamura et al. teach the specimen height positions Z_p at the specimen points X_p, Y_p are determined, by interpolation or mathematical approximation functions, from the height profile of the scanning stage (see Col. 18, line 47 to Col. 19, line 8).

Regarding Claim 13, Yamamura et al. teach the focusing system as an LED or laser autofocus system (see Col. 15, lines 7-9, 25-40).

Regarding Claim 14, Yamamura et al. teach an image field of the camera and the spacings of the specimen points X_p, Y_p are selected in such that an image of the entire specimen results when the images of all the specimen points X, Y are juxtaposed (see Fig. 5a, 6, 7 and Col. 21, lines 52-66).

Regarding Claim 16, Yamamura et al. teach the optical device is a camera for acquiring images at each specimen point X_p, Y_p (see Col. 15, lines 61-62 and Col. 16, lines 34-50).

Regarding Claim 17, Yamamura et al. teach the optical device is an optical measurement device for performing a measurement at respective specimen points X_p, Y_p (see Col. 16, lines 34-50).

Regarding Claim 21, Yamamura et al. teach the measurement device is an optical spectrometer, an ellipsometer, or a layer thickness measurement system (see Col. 1, lines 27-35, Col. 2, lines 52-54 and Col. 16, lines 34-40).

Regarding Claims 11, 12, 19, and 20, Yamamura et al. in view of Katz et al. teach the method and apparatus in Claims 1 and 15, according to the appropriate paragraph above. Yamamura et al. do not specifically disclose the optical imaging system as a microscope (for objects/characteristics too small to be viewed by the unaided eye) or a macroscope (for objects/characteristics visible by the unaided eye). It is well known in the art to apply optical detection systems towards imaging any form or size of objects or features, depending on the desired application. It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the optical imaging system as a microscope or a macroscope in the method and apparatus of Yamamura et al. in view of Katz et al., as a change in size is

generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955).

3. Claims 7, 9, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamura et al. in view of Katz et al., further in view of Fujimoto US Patent No. 6,245,585.

Regarding Claims 7 and 9, Yamamura et al. in view of Katz et al. teach the method in Claim 1, according to the appropriate paragraph above. Yamamura et al. do not teach the height values Z identified at the calibration positions X, Y stored in a lookup table or, if the calibration positions X, Y and specimen points X_p, Y_p are coincident, the specimen height position Z_p is determined from the corresponding height value Z from the lookup table and the reference height Z_{ref}. Fujimoto teaches (see Fig. 1, 3, and 4A) a focusing component for an optical system with a step of calibrating a scanning stage by obtaining and storing height values Z at different calibration positions X, Y of the scanning stage (see Fig. 3 (201-203) and Col. 1, line 48 to Col. 2, line 2) and thereby generating a height profile of the scanning stage (see Fig. 4B and Col. 5, lines 37-39) stored in a memory (see Col. 5, lines 27-38), determining a reference height Z_{ref} (baseline for "offset"- see Col. 4, lines 49-51 and Col. 5, lines 30-38) of the specimen, and setting, while traveling to specimen point X_p, Y_p, a specimen height Z_p pertinent of the respective specimen point X_p, Y_p, the specimen height position being determined from the reference height Z_{ref} and the height profile of the scanning stage (see Fig. 3 (208-210) and Col. 5, line 66 to Col. 6, line 6), with the height values Z identified at the calibration positions X, Y stored in a lookup table (since a memory storing data values for multiple positions is a lookup table) and if the calibration positions X, Y and specimen points X_p, Y_p are coincident (each "cell"), the specimen

height position Z_p is determined (see Col. 6, lines 1-6) from the corresponding height value Z from the lookup table and the reference height Z_{ref} (see Col. 4, lines 49-51). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a lookup table to store the height values Z identified at the calibration positions X, Y and determine the height position Z_p from the height value Z in the lookup table and from the reference height Z_{ref}, as taught by Fujimoto, in the method of Yamamura et al. in view of Katz, to provide faster response during operation by reducing time-consuming processing of height at each calibration location.

Regarding Claim 10, Yamamura et al. in view of Katz et al. teach the method in Claim 1, according to the appropriate paragraph above. Fujimoto et al. do not teach, for calibration of the scanning stage, a flat substrate is placed onto the scanning stage. Fujimoto et al. teach a similar method wherein, for calibration of the scanning stage (and also for scanning of the specimen), a flat substrate (110) is placed onto the scanning stage (see Fig. 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made, for calibration of the scanning stage, to provide a flat substrate placed onto the scanning stage, as taught by Fujimoto in the method of Yamamura et al. in view of Katz et al., to provide additional support for the specimen and provide protection for the scanning stage.

Response to Arguments

4. Applicant's arguments with respect to claims 1-21 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen Yam whose telephone number is (571)272-2449. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on (571)272-2328. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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THANH X. LUU
PRIMARY EXAMINER